

CLAIMS

1. A hydrogen or helium permeation membrane comprising a silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane.
2. The hydrogen or helium permeation membrane according to claim 1, wherein the silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane contains a metal or oxide particle.
3. The hydrogen or helium permeation membrane according to claim 2, wherein the metal or oxide particle comprises a particle or ultrafine particle including at least one of Al, Ti, Si, and Ag, a filler comprising a particle of alumina, titanium oxide, SiO₂, or the like, and an ultrafine particle silica or the like.
4. The hydrogen or helium permeation membrane according to any one of claims 1 to 3, wherein the hydrogen permeation membrane is thermally cured at temperature of 200°C to 500°C after being adjusted to a desired viscosity at temperature of 230°C or lower into a procurser.
5. The hydrogen or helium permeation membrane according to claim 4, wherein the precursor and the hydrogen permeation membrane are subjected to a vacuum heating process at least once at a temperature lower than or equal to a temperature at which the hydrogen permeation membrane is cured.
6. A method for forming a hydrogen or helium permeation membrane comprising the steps of:
 - causing a metal or oxide particle to be contained in a silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane, or a silicon resin that includes at least one

of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane, and then forming a precursor having a desired viscosity at temperature of 230°C or lower; and

thermally curing the precursor at temperature of 200°C to 500°C.

7. The method for forming a hydrogen or helium permeation membrane according to claim 6, wherein the metal or oxide particle comprises a particle or ultrafine particle including at least one of Al, Ti, Si, and Ag, a filler comprising a particle of alumina, titanium oxide, SiO₂, or the like, and an ultrafine particle silica or the like.

8. The method for forming a hydrogen or helium permeation membrane according to claim 7, wherein the step of forming the precursor and the hydrogen or helium permeation membrane comprising performing a vacuum thermal process at least once at a temperature lower than or equal to a temperature at which the hydrogen or helium permeation membrane is cured.

9. A hydrogen or helium storage membrane comprising a silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane.

10. The hydrogen or helium storage membrane according to claim 9, wherein the silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane comprises a metal or oxide particle.

11. The hydrogen or helium storage membrane according to claim 10, wherein the metal or oxide particle comprises a particle or ultrafine particle including at least one of Al, Ti, Si, and Ag, a filler comprising a particle of alumina, titanium oxide, SiO₂, or the like, and an ultrafine particle silica or the like.

12. The hydrogen or helium storage membrane according to claim 10 or 11, wherein the hydrogen storage membrane is thermally cured at temperature of 200°C to 500°C after being adjusted to a desired viscosity at temperature of 230°C or lower into a precursor.

13. The hydrogen or helium storage membrane according to claim 10, wherein the precursor and the hydrogen or helium storage membrane is subjected to a vacuum heating process at least once at a temperature lower than or equal to a temperature at which the hydrogen or helium storage membrane is cured.

14. A method for forming a hydrogen or helium storage membrane comprising the steps of:

forming a precursor having a desired viscosity at a temperature of 230°C or lower from either a silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane, or a silicon resin that includes at least one of phenylheptamethylcyclotetrasiloxane and 2, 6-cis-diphenylhexamethylcyclotetrasiloxane, to which resin a metal or oxide particle is contained; and

thermally curing the precursor at temperature of 200°C to 500°C.

15. The method for forming a hydrogen or helium storage membrane according to claim 14, wherein the metal or oxide particle comprises a particle or ultrafine particle including at least one of Al, Ti, Si, and Ag, a filler comprising a particle of alumina, titanium oxide, SiO₂, or the like, and an ultrafine particle silica or the like.

16. The method for forming a hydrogen or helium storage membrane according to claim 15, wherein the step of forming a hydrogen or helium storage membrane comprises performing a vacuum heating process at least once at a temperature lower than or equal to a temperature at which the hydrogen or helium storage membrane is cured.